



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/US99/24052 <b>(22) International Filing Date:</b> 26 October 1999 (26.10.99)  <b>(30) Priority Data:</b> 60/105,697 26 October 1998 (26.10.98) US  <b>(71) Applicant (for all designated States except US):</b> UNIVERSITY OF UTAH [US/US]; Technology Transfer Office, Suite #110, 615 Arapeen Drive, Salt Lake City, UT 84108 (US).  <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only):</b> VIRKAR, Anil, Vasudeo [US/US]; University of Utah, Materials Science & Engineering, Room 304, 122 S. Central Campus Drive, Salt Lake City, UT 84112-0560 (US). BHADE, Sanjeevani, Vidyadhar [IN/US]; Apt. N304, 3400 Kent Avenue, Metairie, LA 70006 (US).  <b>(74) Agent:</b> SONNTAG, James, L.; P.O. Box 21, Heber City, UT 84032 (US).	<b>(81) Designated States:</b> AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i>	
<b>(54) Title:</b> <del>A MOLECULAR DECOMPOSITION PROCESS FOR THE SYNTHESIS OF NANOSIZE CERAMIC AND METALLIC POWDERS</del>		
<b>(57) Abstract</b> <p>A process is disclosed for forming a nanosize ceramic powder. A precursor ceramic material is formed of a fugitive constituent and a non-soluble constituent in a single phase. The precursor is contacted with a selective solvent (water, acid, etc.) to form a solution of the fugitive constituent in the solvent and a residue of the non-soluble constituent. The precursor is sufficiently reactive with the solvent to form the solution of the fugitive constituent in the solvent and form the nondissolved residue of the non-soluble constituent. The precursor material and the non-soluble residue are sufficiently insoluble in the solvent such that there is insufficient precursor material and non-soluble residue in solution to deposit and precipitate upon the residue of the non-soluble constituent. The fugitive constituent is sufficiently soluble in the solvent such that the precursor reacts with the solvent to form the solution of the fugitive constituent without precipitation and deposition of fugitive constituent upon the residue of the non-soluble constituent in the form of nanosize particles. After the fugitive constituent is dissolved the selective solvent containing the fugitive constituent is removed from the residue. The residue remains in the form of a nanosize powder of the non-soluble constituent.</p>		